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New England Association of Gas Engineers.

OFFICE OF SECRETARY,
BOSTON, January 8, 1884.

The annual meeting of the Association will be held at Young's Hotel, Boston, on the 20th and 21st days of February next, commencing at 11 o'clock A. M., on the 20th of said month.

Members wishing to propose the names of applicants for membership, are requested to send them to the Secretary two days at least before the time of meeting.

The Board of Directors will meet at Young's Hotel, on the evening of February 19. Papers to be read, other than those presented for prizes, must be forwarded to the Secretary in time to be presented to the directors, at this session, for their approval.

Those wishing rooms engaged, will please notify the Secretary on or before February 16.

At the last annual meeting it was "*Resolved*, That the directors of this Association be instructed to offer three prizes, of such amounts as they may see fit, of a value of not less than $100 for the first, for the best papers offered to the Association at its next annual meeting."

The directors have therefore, with the authority thus given them, voted that the following prizes be awarded: For the best paper $100; for the second in merit $50; and for the third in merit $25. The decision as to the merits of the several papers presented, to be made by one or more experts in the gas profession, not active members of the Association. Each paper must be forwarded to the Secretary one week, at least, before the time of the annual meeting, and bear upon it a motto, and be accompanied with a sealed envelope with a similar motto on the outside, and the name of the author inside. The names of the unsuccessful competitors for the prizes will not be made known, and their envelopes will be destroyed, unopened.

In order that our next meeting may be made more interesting and profitable than those of the past, papers bearing upon subjects relating to our profession as gas engineers, whether for prizes or otherwise, are earnestly solicited.

Nothing conduces so largely to make our meetings of real benefit to our members, and give them something of value to carry back to their several fields of labor, as the reading of good papers containing statements of practical results and experiences, accompanied with advice and recommendations by their authors, and the discussions to which they naturally lead.

Managers, superintendents, and engineers of gas companies are cordially invited to the meeting.

GEO. B. NEAL, *Secretary.*

M. S. GREENOUGH, GEO. B. NEAL, *Committee of Arrangements.*

[OFFICIAL NOTICE.]

Western Gas Association.

SECRETARY'S OFFICE, WESTERN GAS ASSOCIATION,
QUINCY, ILLS., February 4, 1884.

I take pleasure in calling your attention to the fact that the Seventh Annual Meeting of the Western Gas Association will be held in the city of St. Louis, Mo., on the 14th, 15th and 16th days of May.

The conspicuous success which attended our last meeting, at Cincinnati, must be still fresh in your memories; and it is for the purpose of urging you to renewed and vigorous efforts, to insure the prosperous issue of our St. Louis meeting, that I thus early invoke your consideration of its importance. I am happy to inform you that the seed sown at Cincinnati is yielding good and plenteous fruit. I am already in receipt of inquiries from a number of your fellow workers, who have not as yet attended any of our reunions, but who are desirous of having their names affixed to our roll of membership. The signal success which has attended your efforts in the past will do much to secure success in the future; but to make assurance doubly sure, to render our Seventh Annual Meeting even more excellent that the Sixth, we must be up and doing and not fall into the error of resting upon the laurels we

have already won. You need not be told that it is next to an impossibility for any business to run itself with profit, and that unless we combine energy with well directed work and system, we cannot bring about the end to which we all aspire. Without your kind and efficient co-operation I can do nothing; with it, the prosperous issue of our coming meeting is placed beyond even the shadow of a doubt.

Bear in mind that the Western Gas Association not only expects, but demands, that every member shall do his duty. To those who so courteously and ably assisted in rendering our last meeting profitable our heartfelt thanks are due; but it is asking too much of them to step into the harness with each succeeding year. Others must, from time to time, volunteer to take their places and do their rightful share of work. Our membership is large and rapidly increasing, and now embraces the names of nearly all the leading gas engineers west of the Alleghenies. Surely, with such an able contingent to look to, a sufficient number of papers can be secured to make a three days meeting as entertaining as could be desired. I shall correspond directly with many of you, and trust that my appeals may not be made in vain. I may here remark that the presentation of two or three papers on the subject of improved furnaces and bench settings will be warmly welcomed, and will excite general interest and attention. Will those who have been experimenting in this field kindly inform us of the results of their labors?

These annual meetings of our fraternity are fast assuming increased importance. The time has already arrived when no gas engineer can afford to ignore their existence or belittle their significance. One cannot stand still in this stirring and progressive age; he must either march to the front, and keep pace with the advance guard, or fall to the rear, and be classed with those who are "behind the times." Let us endeavor, in a spirit of friendly rivalry, to eclipse, if we can, the late largely attended assemblage of the American Association. From all points, North, South, East and West I have received information which unmistakably tells me that numbers will not be lacking, but matters of interest and instruction must be furnished for their entertainment, and I confidently look to you to generously supply that want.

Due notice of the selection of a hotel, rates, etc., and other information relating to our coming meeting, will be given in subsequent issues of the JOURNAL.

A. W. LITTLETON, Secretary.

American Gas Light Association—Official Circular.

OFFICE OF THE AMERICAN GAS LIGHT ASSOCIATION,
ROOM 87, 111 BROADWAY, NEW YORK, Jan. 24, 1884.

To the members of the Association:

As our annual meeting of 1883, with its feast of reason and its social amenities has but so recently passed into history, it may seem rather premature to direct your thoughts toward the convention which will be held in the fall of the present year; but the charge of prematureness, if made, would be more fanciful than real—for in order to make our meeting a success, each member must come prepared to contribute somewhat to the general fund of information, and if this duty be put off till the last moment, it will, in all likelihood, go by default. This danger is the greater by reason of the time of year our convention is held; for in October, with frost only a month off, almost every gas manager is working hard to complete renewals or extensions while the weather permits, and cannot therefore pause to write a paper or go through his records for data. It is therefore from these considerations I urge you, at this season of the year, when the nights of heavy consumption, the necessary accompaniment of the holidays, are falling into the background, and when the time for extensions is still in the future, when the gas manager has a brief respite from his extra labor, to turn your thoughts toward our annual meeting.

Here let me remind you, a paper to be worthy of presentation to the Association need not necessarily be of great length, nor of a ponderous character. An abstruse disquisition, having for its theme some subject taken from the higher realms of gas engineering, or gas physics, has its value, but the worth to a gas manager of a paper giving the record of results obtained in daily practice will be greater. The value of a dissertation of vague generalities, treating of a hundred subjects, but elucidating none, must take a second place before the record of some practical experiment simply told. To mention all the subjects from which you might choose a theme for a paper, or in regard to which you might collect data which would be corroborative of, or in contradiction to, the remarks of another, would be a superfluous task.

The retort house presents at once a field wherein you could make experiments which could not but be of value. This applies particularly to the managers of small works, for to such there are accorded opportunities to make practical experiments, which are denied the engineers of large establishments. Let me mention some of the subjects I have in mind in regard to which we still need information:

Do we gain in the aggregate by mixing coals of different grades?

Is fine coal worth less to the gas maker than lump coal? If so, how much?

What proportion of the gas is given off by a coal at the different stages of the charge, and what is its candle power?

What is the practical value of tar as fuel, compared with coke?

Does a heavy retort setting require more fuel to maintain the heat than one of a light character?

Do foreign retorts give better results than those of domestic manufacture?

What is the most advantageous weight of coal to charge for a given sized retort?

What proportion of coke is required to heat a bench of three retorts in comparison with fives or sixes?

Is there any positive cure for choked standpipes?

To what extent do anti-dips reduce the carbon deposit?

Should the gas and tar be separated at the outlet of the hydraulic main, or should they flow away together?

What is the net gain accruing from the use of an exhauster?

What is the net gain in purification account resulting from the introduction of a new washer or scrubber, which works up the ammoniacal liquor to greater strength?

What weight of water should be mixed with lime to attain the greatest efficiency?

Does the valve system of working purifiers present any advantages over the centre seal plan?

Is lime or iron the cheaper purifying material?

In laying mains, which is to be preferred, the lead or cement joint?

How often should meters be tested, and is the net variation from correct registration of a number of meters in favor of the company or consumer?

The foregoing are a few of the subjects in regard to which practical experiments would be of value; or perhaps extracts from your record book would help dispel the darkness which obscures many of them; but do not for a moment suppose that these are all the subjects worthy of your study, or that they are of more importance than many of their fellows. They merely aggregate an average sample card representing the great storehouse of subjects from which you may choose.

What I would respectfully urge upon you is to select some subject *now*, whether it be from the practical part of your daily work, or from the more abstruse regions of gas engineering, and give it your time and study while you can make the leisure, so that when we next assemble in the Capital of the Union you will be prepared, not only to receive, but to impart information.

If I can be of the least assistance in helping you to select a theme, or in shaping an experiment, consider me at your command. Sincerely yours,

C. J. RUSSELL HUMPHREYS, Secretary.

WHAT THE ASSOCIATION SECRETARIES ARE DOING.

We would direct the especial attention of our readers to the official documents, published in this number of the JOURNAL, from the respective Secretaries of the New England Association of Gas Engineers, the Western Gas Association, and the American Gas Light Association. The notice of the annual meeting of the New England Association has already received attention at our hands, and by the time the JOURNAL reaches a great number of its subscribers the convention at Boston will be in active progress. It is to be regretted that we are unable to give here a full programme of what will take place at the session; but as the meeting of the directors is called for the evening of the 19th, such a course is a simple impossibility. We hope that this order of things will not obtain much longer, and that measures will be taken looking to an earlier calling together of the directors, say one week before the initial date of meeting, so that due notice can be given to the fraternity as to what the programme of the sessions is to embrace. We can but add right here that if the Boston meeting is only half as successful as we expect it to be, all former records of this body will be completely outstripped.

Secretary A. W. Littleton, of the Western Gas Association, is early in the field with his notice to its members of the near approach of the Seventh Annual Meeting. The success which has attended the doings of this body, a success dating from its very formation, is, no wonder, the occasion of much laudable pride on the part of those who laid the foundation of the structure. The spirit of aggressiveness and prompt action never fails to characterize the "man from the West," but Secretary Littleton notes the importance of pointing out the danger of resting on laurels already won, and believes also in plainly telling his fellow-members fairness and honesty demand that those who in the past have contributed to the common good, in the preparation of papers, etc., must not be expected still to bear the brunt of the work. Now, we do not for a moment suppose that this is likely to happen, and neither

does Secretary Littleton; but no harm can possibly accrue from keeping in view the prominent fact that all should furnish their pro rata of labor in order that the general aim and objects of the Association be honestly illustrated and sustained.

If the members of the Western Gas Association only imitate the zeal displayed by their Secretary, it is an easy matter to forecast what will be revealed at the St. Louis meeting in May next.

Mr. C. J. R. Humphreys, who succeeded Capt. W. H. White as Secretary of the American Gas Light Association, publishes a model circular, and presents it at the right time. The American Association has always been fortunate and happy in the selection of its officers; we need only mention Nettleton, White, and now Humphreys, to show that the calibre of the men in charge of the Secretary's desk was of the right sort. When the question was raised, at the last annual meeting of the Association, of increasing the salary attached to this position, we made no comment at the time, but would here like to put ourselves on record as honestly believing that the change then enacted was but a matter of simple justice; knowing, as we do, the vast amount of labor the duties of the office entail, the sum of $500 per annum is not only not a high figure, but rather a low rate of compensation for the services rendered. The remarks made by Mr. Butterworth on the subject when it was discussed, go right to the point, and cover the whole ground.

Secretary Humphrey's "first gun" is well primed, and hits the target squarely. We give it in full on the second page of this number; it speaks for itself, and requires neither elucidation nor explanation.

[A Paper read before the Society of Gas Lighting.]

Jottings from a Gas Manager's Notebook in Regard to Retort Settings.

By Mr. F. C. Sherman.

We have had several able papers, upon this subject, presented to the notice of the Society during 1883. I should not care to go over the same ground, were not the retort setting so all important a feature in the construction and working of gas works; and one which, notwithstanding the increased attention given to it for the last few years, is still far from being exhausted, or even satisfactorily settled, either as regards the principles to be observed, or the form in which these are to be carried out.

As evidence of this recall the almost endless variety of settings adopted in the gas works of this State—hardly any two of them alike. Our late lamented Secretary prepared for us a tabulated statement showing the coke and breeze made per ton of coal carbonized, coke used, per cent. of coke made, and dimensions of furnaces employed by the members of this Society. With this statement before him he goes on to say:

"It will be seen, from this table, that there is considerable variation in results obtained in our practice, and that, taking the fuel by the percentage of coke made, it varies all the way from 32 to 50 per cent.; while, by the percentage of weight, it varies from 21.5 to 33.4 per cent." He well remarked, "Certainly, here is a margin sufficiently large for considerable improvement; and, what is singular, no two furnaces are of the same dimensions."

The above extracts are from a very able paper* prepared for this Society by its late Secretary, and published in its proceedings for 1882, entitled, "The Advantages of Generator Furnaces with Recuperation." This paper was prepared after careful and extensive observation of the results obtained from these furnaces in Great Britain and on the Continent. The very favorable conditions under which he examined the working of the different furnace systems, being such as few else of us could command, lend additional weight to his favorable testimony in regard to them. No one who listened to the reading of this paper could come to any other conclusion than that the proper method of heating our retorts is by "Gas Furnaces."

I myself believe in this system of heating retorts, and think it is only a question of time when we shall all be obliged to adopt it. If we fail to so act, some one else will do it for us. The present wasteful practice must give place to improved methods of heating.

It is safe to observe that gas furnaces would be found in the works of every member of this Society, if our business were carried on under the keen competition which exists generally in other branches of manufacturing. Let no one dream that the problem of gaseous fuel, and its application to our art, is already solved. Some of our enterprising and leading engineers, backed by appreciative boards of directors, are spending thousands in experiments looking to the perfection of the system. The various methods of applying the improved system of heating bristle with patents. Many of us are so situated that we cannot adopt such methods without incurring a heavy outlay. The works under my charge represent the location of too many. The retort house is built upon filled ground, with pile foundation; tide-water comes within three feet of my ash-pans. It would be no easy task to convince "the man at the helm," that such an outlay, under our conditions, would pay. Until we can see our way clear to institute this change we are bound to make the most of our present facilities for heating our retorts, and to adopt the best plan of setting them. It is to get information on this matter that I venture to occupy your attention with that which is principally a record of my failures in this direction.

Although I have been long engaged in our business, I am still only a learner. According to the statements of many engineers, in regard to the records obtained in their retort houses, many of us can, and should, greatly improve in our working results. Upon first taking charge of my present works I found the hydraulic main, the tar drains and tanks filled with solid pitch. Looking to the prevention of a recurrence of such a condition of affairs, the charges were run on four hours instead of five, as was the former custom; the front walls of the settings were increased in thickness from 8 to 12 inches; the brickwork covering the arches was raised 20 inches, and the standpipes lengthened that distance. Since these changes were instituted, although working at the same, or greater, heats, we have had no pitch deposits in our mains. I also found "through" retorts in use. The advantages claimed for these are the ease with which they are kept free from carbon, and also the augmented floor space gained in the hottest portion of the retort. In practice, I found it difficult to keep the standpipes open—first one would close, and then the other. If one retort or furnace gave out it necessitated the letting down of two; the charging had to be done on each side simultaneously.

While using through retorts I experimented with what is known as the Lowe reciprocating method. By the use of valves the gas was made to pass through, first, one standpipe and then the other, and also to pass over incandescent coke. Working in this way we found it difficult to keep the standpipes clear, and the charging was attended with great inconvenience, owing to gas from the half-carbonized charges puffing into the faces of the stokers.

I also experimented with the Davison retorts. These were of the ordinary size at the mouth end, and splayed out at the rear end to 30 inches, and had projections on them which answered for tiles when they were being set. Davison claimed for these retorts an increse in quantity and quality of gas made from a given quantity of coal carbonized. We failed to get the claimed results, and returned to our old settings, poorer and wiser for our experience with Mr. Davison.

In 1880 I put in eight benches of retorts, 15″ × 30″ and 9 feet long, into our arches, which are 7′2″ wide. The retorts and settings filled up our ovens to such an extent that there was no space left for the free circulation of the heat. The results obtained were so poor that we abandoned them after six months use. The heat in the furnaces of this setting was intense, while the retorts were only partially heated.

The setting I have used, principally, for the last eight years (a plan of which I have with me) is what I call Mr. Edge's plan, as I obtained it from him. It is a light, open setting. Mr. Edge strongly advocated a light setting. The least tile employed in settings the better the results, and his results proved the correctness of his assertions. I have never obtained, in my practice, results equal to those gained by Mr. Edge.

We all know the arguments adduced by those who advocate a heavy setting. I have tried these latter, and my experience goes in favor of a light setting. The tile used in setting my large retorts (which was a heavy setting) cost $120 as against $30 for the Edge plan.

Another valuable lesson learned by me from that Gamaliel of our profession was the necessity of keeping our retorts free from carbon; he not only proved the necessity of this, but also showed us how to do it. I recently measured a piece of retort carbon that was 2′9″ long, and must have filled the back end of a retort for that space. The fuel and labor lost in working retorts in that condition need no figures to prove such losses to your minds.

Mr. Edge advised the removal of the carbon once a month. During the last two years I have employed settings known as the Gardner, or Newport; these are really an old English bridge-wall setting. I am informed that they are largely used at the West. They are what would be termed a heavy setting. I have obtained excellent results from them.

Recently my attention has been called to several methods of heating the air from the waste heat of the flues, before it enters the furnace. Mr. McElroy, of Pittsburgh, Pa., uses this style of furnace and the bridge-wall setting. His results as stated at the Pittsburgh meeting of the American Gas Light Association, and reported in its proceedings, Vol. V., p. 284, are 18.2 pounds of coke to 100 pounds of coal carbonized. Mr. Walker, of the Citizens works, Rochester, N. Y., writes me that he is carbonizing with 20 per cent. in weight of coke to coal used in retorts; he employs air-flues with ordinary furnaces. Mr. Coggshall, of the Fitchburgh (Mass.) gas company, informs me that he produces 8,000 cubic feet per retort, in a single bench, with heated air and the bridge-wall setting.

At the above-mentioned meeting, Mr. Hyde, Engineer of the Cleveland,

* See Journal, Vol. XXXVI., No. 3, Feb. 2, 1882, pp. 51 to 54; also, Vol. XXXVI, No. 9, May 2, 1882, pp. 195 to 197.

Ohio, works, on page 288, is reported as carbonizing with 17 per cent. of coke, by weight, in ordinary furnaces.

If these statements are correct, there is great room for improvement in our methods of setting retorts; some engineers recommend the leaving out of the covering tile to the bottom flue. My experience with this method of setting retorts has been that the bottom ones soon gave out. As illustrating the loss of heat occasioned by placing retort settings over water, or on ground reclaimed from the sea, I would state that recently I had occasion to remove a portion of the stone foundation of our benches, in order to deepen the furnaces. Upon removing a portion, I was met with a great volume of steam. I am convinced that, owing to the unfavorable location of our furnaces, we are wasting 10 per cent. of our fuel.

Cooper's Coal Liming Process.

Mr. R. P. Spice, M.Inst.C.E., contributes to the *Journal of Gas Lighting* a very interesting account of the experiments carried on at the Tunbridge Wells Gas Works, to determine the merits of Cooper's limed-coal method of gas manufacture. Mr. Spice is always thorough in his work, and the results of his experiments contain so much of value that we reproduce them herewith:

"This process has been tried at the Tunbridge Wells Gas Works, with the consent of the directors of the company, under my advice. My reason for advising the trial being made was that these works, from their completeness, afforded more than usual facilities for obtaining specific and reliable results from such an experiment than some others in which the process had been tried and failed to obtain a permanent footing. And I have pleasure in acknowledging that, in addition to the advantages presented in the completeness of the facilities referred to, I am indebted to the able assistance of the Manager (Mr. A. Dougall, Jr.), by which the task of making the statement I now send you has been rendered simple and easy; and the facts which I now state are based upon figures furnished by him.

"On my first inquiry at the works into the progress of the experiment, I found that the quantity of gas made per ton of limed coal was about the same as from the same coal unlimed; but that the illuminating power was practically 1 candle less—viz., 14.60 instead of 15.70 candles, which had been the average for the year up to the time of the adoption of the process. This, however, was at once corrected by an increase in the quantity of cannel from 2 per cent. (the usual proportion employed) to 3¾ per cent. (in round numbers); the rule constantly observed at these works being to deliver gas of the uniform power of 15½ candles within a very small fraction.

"But this necessity for an increased consumption of cannel was discovered to be due to the use of an excessive quantity of oxide of iron in the purifiers; and when two purifiers had been thrown out of action, the illuminating power increased 1 candle; the quantity of the cannel afterward being accordingly reduced to the former proportion. This discovery showed that the excess in area of purifiers not only did no good, but occasioned positive loss, by arresting light-giving matter. The results, so far, were proof of there being neither loss nor gain by using the process, in either the quantity or the illuminating power of the gas obtained. The tar produced showed so small an increase as not to be worth mentioning.

"The coke was greater in weight by the weight of lime used per ton of coal; and that used in the furnaces was the same as before, as to the percentage of the make. There is, however, a slight drawback to the use of the coke from limed coal in the furnaces, on the score of some addition to the cost of wear and tear of furnace bars, which undoubtedly do not last so long as in the ordinary way; the reason being that the sulphate of lime which it contains fuses at a heat bordering on whiteness, and forms a kind of enamel which adheres strongly to metals, even to an objectionable degree in the platinum crucibles used by chemists. This, however, is a small matter; the entire cost of furnace bars being an almost infinitesimal quantity. But for all other purposes than those requiring an intense degree of heat it appears to me that the character of the coke is improved; for there is no doubt it burns more freely in open grates. This will be appreciated generally by consumers, if the extra quantity of ash, and consequent dust, in an apartment is not regarded as a drawback; and it is quite possible that the greater liveliness and cheerfulness of a limed-coke fire may be considered generally as ample compensation. However, let this be as it may, I do not intend to put any money value on the character of the coke. All that is certain about it is that the sale of coke at Tunbridge Wells has not been injuriously affected by it.

"The coal used during the two months' trial was of a very inferior character, a considerable proportion of it looking very much like the sweepings of a coal merchant's yard. Probably some of the trucks were filled with slack at the colliery, or at some intermediate station on the way between Newcastle and the works. This, at any rate, is my suspicion. It was proved, on analysis, to contain 1.7 per cent. of sulphur, or 38.1 pounds per ton. When this coal was carbonized in the usual way, without the use of Cooper's process, the liquor was charged to the same extent with sulphur; but the quantity of sulphur in the gas was much larger.

"The increase in the quantity of ammonia obtained is a very striking and important feature, the figures showing a gain of 30 per cent., which I have ascertained, from further working, is not the full increase attainable. But this *proved* quantity is all I deal with in summing up the results obtained in the two months' trial.

Comparative Statement of Working Results.

	Coals Used.				Total Gas Made.	Gas Made per Ton.	Gas Made per Mouthpiece.	Illuminating Power, in Sperm Candles.	Value in Pounds of Sperm.	Coke Made per Ton, in Pounds.	Ammoniacal Liquor per Ton of Coal, in Gallons.	Tar per Ton, in Gallons.	Duration of Purifiers.	Gas Purified per Box.
	Common.		Cannel.											
	Tons.	Cwt.	Tons.	Cwt.	Cubic Feet.	Cub. Ft.	Cub. Ft.						Days.	Cub. Ft.
Without lime....	7970	14	160	8	82,589,000	10,157	6,841	15.72	547.43	1,568	28.5 of 10 oz.	10.0	10	5,200,000
With lime.....	2187	.....	*78	4	22,742,000	10,044	6,027	15.62	537.90	1,624	37.0 of 10 oz. gain 30 p. ct.	10.2	50	2,600,000
Special Test.														
Without lime....	108	12	2	2	1,085,000	9,801	6,458	15.77	529.92	.....	.....	.....	.....	.....
With lime.....	104	4	2	2	1,043,000	8,811	5,960	15.63	525.75	.....	.....	.....	.....	.....

* This large proportion of cannel was used before I discovered that the excessive purifying area was absorbing so much of the illuminating power.—A. D.

"In the purifying department the effect of the process is startling. Previous to its use, 10 days was about the limit of duration of the power of a purifier; and then it required renewal and a fresh supply of revivified oxide of iron. But since the application of the Cooper process, no change has been required up to the present time—a period of 70 days; about 36 million feet of gas having been purified without opening a box. So far as I can ascertain, it appears probable that no change will be required before 50 million feet have passed through the purifiers. If this estimate be realized, which I fully anticipate, the meaning of it will be that the purifiers will only require opening twice in a year, instead of 36 times, as formerly. And, again, what does this mean? Why, a considerable saving in the cost of labor for emptying, revivifying, and recharging; and, greater than all from the standpoint of the sanitary reformer—*i. e.*, the virtual abolishing of what is considered to be a serious nuisance in the neighborhood of a gas works—the poisoning of the atmosphere by the exhalations from the foul material exposed to the action of the air. And I am satisfied that this improvement in the art of purifying gas, which has been so long a desideratum, is no longer a dream, but is within the region of what are called "practical politics."

"The money value of this and the other advantages, as well as the contrary side of the account, I shall deal with at the end of this article; but before I give the figures I desire to state that the experiment was discontinued by Mr. Dougall on the 5th of this month, to enable him to give me further data by working for two or three days on the old lines. At that juncture a considerable quantity of another kind of coal was delivered into store, covering up completely the old stock; thus preventing his resuming the work under the same conditions as before. Although there is no other disturbing effect, the working of these new coals has caused a considerable

increase in the sulphur compounds. These had previously been, on the average of several weeks, only 3 grains in the 100 cubic feet of gas; whereas they are now 9 or 10 grains. But, even in regard to this altered state of things, the process has been proved in these experiments to be unquestionably useful in reducing the quantity of these obnoxious ingredients; the removal or non-removal of which, however, within reasonable limits, does not affect the practical question of commercial value.

"The difference in the character of the coal which has caused these altered results since the 4th of this month has been proved by analysis to consist of a large increase in the quantity of ash. This impurity amounts, in the coal now being used, to 10.50 per cent., which is more than double the quantity contained in that used in the previous two months' working. These coals, in ordinary working, gave gas containing 26.4 grains of sulphur compounds in 100 cubic feet; and this, by the coal-liming process, has been reduced to a mean of 15.24 grains from the 6th to the 16th of January.

"I send you herewith the original tabulated statement of results furnished to me by Mr. Dougall; and by it you will see the gas produced per mouthpiece is less by this method of working than without it; which, of course, is an inevitable result. This involves an increase in the cost of labor, wear and tear, retorts, etc.; and as these items amounted in the year 1882 to £1,400, I have debited the account for working expenses at the rate of 10 per cent. on the amount.

"Now as to the financial results. In the year named, 100 tons of sulphate of ammonia were sold. As the increased amount of ammonia due to the process is 30 per cent., the additional return from this product, at the same rate as was then realized, would be £588; but as the market value at the present time is less by £5 per ton, the gain would be less by £150, making the net sum £438.

Amount realized, as above	£438
The disuse of lime in purifiers amounts to a saving of	30
The saving in cost of labor in the purifying department will be	80
And the saving in cost of purifying material I estimate at	480
Total	£1,028
The sum of the advantages, therefore, resulting from carbonizing 10,000 tons of coal I make less by the additional cost of wear and tear, and the lime used in the retorts	240
The balance in favor of the account being	£788

"The actual cost of the lime used in the retorts would be £200 per annum. But I reckon on about one-half of this coming back in the coke sold, the weight of it being increased to the extent of the weight of the lime which becomes incorporated with it—and the coke at these works is sold by weight. In this way the actual cost of the lime is reduced to £100, which is included in the item of £240.

"I will only add that by the use of West's method of mechanical stoking at these works, great facilities are afforded for mixing the lime with the coal and delivering it into the retorts."

The International Electrical Exhibition to be Held at Philadelphia, Pa.

The International Electrical Exhibition, to be held at Philadelphia. Pa., under the auspices of the Franklin Institute of that city, is now assuming such shape that the preliminary steps may be stated as at an end. The exhibition will be opened on Tuesday September 2, 1884, and will close on Saturday, October 11. The following are the rules and regulations, which have been adopted to govern the display:

1. The building at Thirty-second street and Lancaster avenue, will be opened for the reception of the articles and goods intended for exhibition on Monday, August 11, and remain open for that purpose until Saturday, August 30. On Tuesday, September 2, the exhibition will be formally opened to the public at 12 o'clock M., and continue open daily (Sunday excepted) from 10 A. M. to 10 P. M., until Saturday, October 11.

2. Each exhibitor will be required to pay an entrance fee of $5.00, for which he will receive one season ticket of admission, not transferable and issued to any one of the members of a firm or corporation that may be exhibitors; additional tickets for other members of a firm or the Executive officers of corporations being procurable at the same rate for each person. Tickets of admission for the attendents absolutely necessary for the care and operation of the exhibits can be procured free of charge subject to the regulation of the committee in charge of tickets, and these tickets are to be forfeited if wrongfully used.

The charge for space occupied by exhibits, either on the floor, or under the ground, or suspended above the aisles, or on the walls (to be paid upon the receipt of permit) will be as follows:

All spaces under 10 square feet	$2.00
From 10 to 100 square feet	20 cents per square ft.
100 square feet @ 20 cents per square foot	$20.00
200 " " @ 17½ " " "	35.00
300 " " @ 15½ " " "	46.50
400 " " @ 14 " " "	56.00
500 " " @ 13 " " "	65.00
600 " " @ 12¼ " " "	73.50
700 " " @ 11 4-7ths cents per square foot	81.00
800 " " @ 11 cents per square foot	88.00
900 " " @ 10½ " " "	94.50
1,000 " " @ 10 " " "	100.00
All spaces measuring over 1,000 square feet	10 cents per square ft.

The rate per square foot for any fractional excess of space over any even hundred in the above table will be the rate of such hundred diminished by a due proportion of the differences between that rate and the rate of the next hundred.

3. All applications for space must be made before August 30, on printed blank forms, to be furnished by the committee; and they will be considered and the space allotted to applicants in the order of their reception; and space allotted to exhibitors, but not occupied by August 30, may be assigned to other exhibitors. Whenever the articles will admit, exhibitors are requested to display them in glass cases.

4. All articles delivered in the building shall be reported to the committee, who will direct their location and assign them the proper space. Any article shipped to the exhibition by rail or otherwise, must have freight and charges prepaid, and invoice and bill of lading mailed to "Committee of Exhibitors, Franklin Institute, Philadelphia, U. S. A."

5. Exhibitors or their agents will be furnished by the entry clerk with duplicate cards, upon which must be placed a description of each article entered for exhibition; these will be countersigned on the receipt of the articles into the exhibition. One of these cards shall be conspicuously attached to the article which it describes, and the other must be retained by the exhibitor, and be presented as his order for the delivery of the article specified, at the close of the exhibition.

6. The committee reserve the right to exclude from the building and premises all articles of a dangerous or offensive or otherwise objectionable character.

7. No article can be removed from the building during the time of the exhibition, unless by consent of the committee.

8. A police force will be in attendance upon the premises during the exhibition and watchmen at night; but all articles on exhibition will be at the risk of the owner.

9. Power will be furnished to drive machines at the rate of 3 cents per horse power per hour, the power to be rated at 60 square feet per minute of belt if the belt is single, and 40 square feet per minute if the belt is double. The tension on the belt to be subject to the judgment of the engineer in charge, whose decision is final. If machines are driven direct from engines furnished by the exhibitors, the steam used will be rated by indicator, and charged at the same rate per horse power. Full credit will be given for power for creating light ordered by the General Superintendent.

10. Signs will not be allowed of greater size than 500 square inches, nor shall such signs be elevated above the exhibits. The distribution of circulars, cards or samples about the building will not be permitted; exhibitors can distribute such things only from their own stand.

11. The arrangement and distribution of the electric conductors in all parts of the building shall be wholly under the direction of the electrician in charge, who will decide on the position and determine the character of the insulation, under the rules laid down by the committee.

12. No awards or premiums are offered by the Institute, but in place thereof a report to the Institute will be prepared by a Board of Examiners, which report will be as full as the time and opportunity will permit. Exhibitors are requested to give at the time of the opening of the exhibition detailed descriptions of their exhibits addressed to the Board of Examiners; describing the merits of each exhibit as understood by the exhibitor, such matter, at the discretion of the Examiners, to be used in their report. If, however, any of the exhibitors desire expert examination or competitive tests of their displays, such tests will be conducted by the Institute to the extent practicable in the time, provided the cost of the materials and instruments used be borne by the exhibitors desiring the test. The special committees to whom these tests will be referred will be appointed by the Board of Managers of the Institute, subject to the approval of the majority of those asking for the test if it is competitive. The original copy of all reports shall remain the property of the Institute, which shall have the first right of publication.

The Institute reserves the right to enter into such other scientific work touching the exhibition (not requested by the exhibitors) as in its judgment may tend to the advancement of science.

The examiners shall be appointed by the Board of Managers, and shall be

men of acknowledged integrity, skill, and experience in the class of articles assigned to them; and no examiner shall serve on any class in which he may be an exhibitor or be otherwise directly interested. The mornings of each day, until fifteen minutes before the time of opening the exhibition, shall be appropriated to the examiners, who shall be attended only by such persons as they may invite to be present.

13. Exhibitors are required to attach to their exhibit a printed description in English of the use and operation of the object exhibited, for public information, if at any time the exhibit should be left without attendants who can explain it.

Safety-Lamps in Mining Operations.

Mr. Charles Gordon recently read a paper, before the North Staffordshire (England) Mining Institute, the subject of which was a consideration of the efficiency and merits of the various lamps employed in the illumination of mining properties. The author said that the mining community was now anxiously expecting the report of the Royal Commission, which would, no doubt, greatly influence and direct the choice of the lamps of the future. It was highly probable that the ordinary Davy and the Clanny would receive their death blow at the hands of the Commissioners, the former—which had been for many years in high favor and rendered good service—from its insecurity in explosive mixtures, where there were strong currents, and the inducement to smoking which it presented, besides the ease with which a slight blow with a pick or a stone might instantly change it from a useful assistant to a highly dangerous weapon. The Clanny, which had always been a useful road lamp, was to be condemned from the element of danger arising from a sudden fracture of the glass without extinguishing the flame. The lamp of the immediate future that would probably be recommended by the Commission would be the Williamson, the Protector, or the Belgian Mueseler. The Protector and the Mueseler were formed on somewhat similar lines, whilst the Williamson might be described as a modification of the Stephenson and the Clanny. It had two glasses, the inner one resembling a Stephenson, and fitted with a copper top or cap. The outer glass resembled that of a Clanny. The method of supplying the Williamson lamp with air was similar to that of a Stephenson, but its great superiority over that lamp was due to the fact that the whole of the air must press through a gauze to feed the flame. It was said that in all its trials this lamp had never been exploded. It further possessed the property of remaining alight when tilted, which lamps of the Mueseler pattern did not. The weights of the lamps were as follows: Protector and Williamson, each 3 lbs. 4 ozs.; Clanny, 2 lbs. 10 ozs.; Stephenson and Mueseler, each 2 lbs. 4 ozs.; Davy, 2 lbs. The weight of a lamp should be studied, and especially of those carried by the firemen and officials appointed to examine the workings. It was only those who had to carry lamps all day that could understand the fatigue it occasioned, and the lighter the lamps were produced, and the more convenient they were to handle, the better prospect was there of having the workings properly examined.

A lamp should not be made so sensitive as to go out at the least shock. In many cases lamps might be suddenly extinguished, and leave the workmen in total ignorance whether the cause was a shock or the pressure of an explosive mixture. With regard to the attempts that had been made to produce an electric lamp for mining purposes, it was obvious to all acquainted with underground workings that nothing but a self-contained lamp would meet the want. All lamps dependent on fixed wires must fail; since, from the ever changing condition of mines, they were continually in danger of breakage, thereby causing the severance of the electric current. For permanent roads that stood well, and for stations, the electric light might, perhaps, be beneficially employed, but when that was the case it was generally safe to use oil lamps. The Hope safety-lamp was a good pattern for stationary purposes. This lamp, while evidently adapted from the railway carriage lamp, possessed other features, such as the gauze over the flame, the improved method of adjusting the wick, the fact that it might be fastened either with a padlock or a lead rivet, and the avoidance of danger from fire. After noticing the various kinds of lamps now in use, and the districts in which they were most in favor, he quoted from a report of experiments made in October last in the Aldwark Main Colliery, showing that the Davy was in each case exploded, while for four hours attempts were made without effect to explode the Mueseler and the Williamson lamps. Having made some remarks on the locking of lamps, he gave details respecting their illuminating power, and made suggestions as to the management of lamp-houses. He next dwelt on the subject of testing lamps, and described a testing apparatus, lent for the occasion by Messrs. Edwards, of Wakefield, who also lent a large collection of lamps, ancient and modern, for the illustration of the paper.

Mr. W. Y. Craig, M.P., agreed with Mr. Gordon that any light that was not self-contained, and that depended upon wires, would not answer in a mine. Of course it would be very much the same in effect as had been experienced in conducting power for working machinery in coal getting. They had found machines for coal getting very good; but inasmuch as they depended upon power conducted in pipes not self-contained, they had not come into general use, and he apprehended that it would be the same with regard to safety-lamps. He obtained a dozen Mueseler lamps a few years ago, and after using them for some time it was found that they were easily extinguished, and that the least movement on one side put out the light. The quality for which they were specially recommended was their sensitiveness in enabling them to detect gas. He tried a Mueseler lamp himself where there was gas, and he did not find it as good as the Davy for detecting gas. On the contrary, he found that he could go further amongst the gas with the Mueseler than with the Davy without detecting it. Both the Davy and the Mueseler were tried in the presence of Mr. Sawyer, the Assistant Inspector of Mines, who testified to the fact that they could go further with the Mueseler than with the Davy, that they could carry the Mueseler far beyond what the Davy showed to be a dangerous point. He should not say there was anything in the Mueseler lamp which could recommend its more general use than they found in the Clanny. There was no doubt it was as dangerous, as any fracture in the glass rendered it as bad as a naked light. But that was the case with other lamps, and great care was necessary to prevent the glass from being fractured, or the gauze to be damaged by a pick or a stone. The lamp perhaps most exempt from this danger was the Stephenson, which was on the whole the safest lamp, but it had this disadvantage, that it was heavier, and workmen were not fond of using it. No doubt the subject was one of paramount importance, and it was impossible to discuss it too much or too closely.

The Petroleum Outlook.

Stowell's Petroleum Reporter, for January, in looking over the petroleum market says, that as far as a comparison between the months of November and December is concerned there is but little to note. Prices have remained remarkably steady during the month under review, no "boom" having put in an appearance; and the average price for the month was $1.14¼ as against $1.14¼, the average price in November. The only marked change is a decrease in shipments, and although the daily average has also fallen off, this latter decrease has not been enough to balance the decrease in shipments, and a considerable increase in stock is the result; stocks once more taking an upward turn, after tending downward for some three months. However, the month may be said to be as barren of distinguishing features as any of its immediate predecessors.

The month under review concludes the year 1883, and a glance over the course of the oil trade during the year may not be inappropriate. We can observe in our retrospect but few events of importance. When the year opened public attention was no longer attracted to Cherry Grove, which had run its course, and closed its career in the fall of 1882, and the points of chief interest were found in the Forest county and Butler county (Bald Ridge) fields. These districts have continued to interest oil producers during the year in review, but no permanently large wells have been brought in, and operations in older fields have engaged some attention. No operations of the year, however, deserve any special attention, and the information of chief interest is contained in the statistics for the year.

It will be found from the statistics that for no month during 1883 did the daily average production of petroleum rise as high as even the yearly average for the past three years, and that the average for 1883 is 63,336 barrels, a lower average than we have had since 1879. Turning to the well account for some insight into the causes of this, we find that the average number of drilling wells for the year is less than has been the case since 1875. There were fewer wells completed last year than in any year since 1875, and the yearly average number of producing wells has commenced to decrease, something that has not been known since the same year. Considering all these facts, and also noting that the total shipments for the year are the highest yet known (although the increase over last year's total is not very great), we are in a measure prepared to understand the most interesting feature of 1883, namely, the decline in stocks which was noticeable at several times during the year. Since 1878 the stocks of petroleum on hand have steadily increased month by month, and the fact that some months of the present year have indicated a decrease is without doubt important. It is true that this decrease has not been uniform, and that some months have shown an increase instead of a decrease; the important truth indicated is that production and consumption have begun to balance, which, in connection with the tendency as to producing wells, is very cheering to those who desire better prices.

The latter individual may also take heart from the table of prices. After four years with prices almost constantly below the dollar line, it seems that enough strength has been attained during the past year to hold them above that point. For but three months during 1883—January, March and April—were prices lower than $1, and the average for the year, $1.05¼, is a higher yearly average than has been the case since 1878.

Everything as thus reviewed seems favorable to a better era in the immediate future for the oil trade. Of course no one can predict definitely the new discoveries which may be made, but, viewing the persistent efforts made during last year to turn up some new districts, it would seem that there is but very little chance of the discovering of a new field which would "bear" the market greatly. The chances, then, are that we will have a continuance of the present situation with regard to the field, and a steadily improving trade as to prices.

Tinkering the Patent Laws.

It may be judged from the following that the *Scientific American* thinks the present protective measures, having for their object the guarantee that those who devise ideas, and then patent them, shall have the fullest protection possible against any and all forms of piracy. Some people who are not patentees, but who would still like to take advantage of, and derive profit from, the fertile wits of others, will say, "Why should not that paper take the stand it does, since its owners reap great benefits from their dealings with the Patent Office?" But those who give fair consideration to the question will unite with us in saying that the *Scientific American's* argument is entirely just. The author of the article in question says that one of the strongest safeguards of moveable property lies in the fact that stolen goods are not readily salable. The market for stolen property is spoiled or greatly restricted by the circumstance that in law the receiver is as bad as the thief, and the innocent possessor of stolen goods is likely to loose the purchase money, if he does not get into more serious trouble, when the rightful owner's claim is made good. For a large class of patented inventions meeting popular needs this proper safeguard has been their chief safeguard. The infringing manufacturer is usually irresponsible, and the unauthorized vender cannot be found when the infringement is discovered; but the fact that the wrongful user is also liable has made prudent men cautions in dealing in such things; and enough men are prudent to diminish materially the profits of infringers and so discourage the dishonest from making over-free with the rights of others.

In asking Congress to take away this element of protection, hitherto accorded by the law to property held under patent rights, the Patent Committee allege that they do so on the ground that it has led to grievous abuses. There has been, they say, much complaint of hardship arising from the practice of owners or pretended owners of patents in allowing infringements to go on for a term of years, and then sending around agents to demand damages under threats of lawsuits, to the distress and loss of many innocent people. This is the only excuse given for legislation exempting the user of infringing manufactures, and confining the penalty for infringment to the maker and vender only. That the excuse would be inadequate, if true, has been amply shown in these columns. But is it true?

In what part of the country and in connection with what patents or pretended patents have the alleged abuses occurred and complaints arisen? And what proportion do the alleged complainers bear numerically to the 50,000,000 people who in every sphere and walk in life are constantly surrounded by and dependent for occupation, income, convenience, or necessity upon articles patented or manufactured under patent rights? Has there come to the ears of the committee one complaint from each 100,000 patent users, in connection with one in each 1,000 patents? And what proportion do the pretended hardships bear to the hardships complained of through disputed ownerships of other species of property?

If every person overreached, or who should think himself overreached and damaged, in a horse-trade, were to complain to Congress, the annual list of complainants would be a very long one; but that would scarcely be held a valid reason for legislation destroying or impairing all property rights in horses.

The truth is, the pretext for the recent action of the House of Representatives, in connection with suits for infringement, is essentially a false one. There has been no general practice of the sort alleged; from the nature of men and things, there cannot be. As a class, patentees are not eager for lawsuits; indeed, suits at law are relatively fewer in connection with patents than with any other species of property of equal scope and value. And the proportion of all the patent suits that could by any forcing be brought into the class complained of by the Patent Committee must be and is extremely small. If pretended owners of patents harass people by threats of suits for infringement, the proper course is to turn the offenders over to the local authorities for punishment, as in the case of all other petty swindlers, and not punish all patent owners for the crimes of a few pretenders to patent-rights.

It is not denied that there have been cases—marvelously few, though, in view of the number of patents issued, and the important part which patents play in the industrial world—a few cases in which patentees have been kept from the enjoyment of their rights by litigation, usually against powerful infringers, until other infringers have come to believe that the patentee had no rights or would never be able to enforce them; and then, after a struggle more or less prolonged, the patentee's rights having been estalished, they have proceeded to claim damages for the unlawful use of their invention. Sometimes the offenders have been morally innocent through ignorance; but more frequently they have discounted the chance of ever being called to account, and after infringing wantonly have complained of hardship when their miscalculation has reacted to their hurt.

It is, however, not this class of complainants whom the Patentee Committee ask to have protected, but the victims of those who purposely allow the use of their inventions simply to gain ground for subsequent blackmailing operations under threats of lawsuits against innocent offenders against the law. The possible justice of the committee's requests hinges upon the existence of a considerable class of such evil-minded patentees. With all respect to the sincerity of the committee, we may say that evidence is lacking of the existence, or the possible existence, of such a class; and consequently there is, on the committee's own showing, no ground for legislation such as they have asked for and obtained in the House.

The only hope that patentees can now have of protection against the proposed invasion of the rightful privileges they have hitherto enjoyed, lies in the superior knowledge of the Senate, both as to the facts of the case and the conditions under which a large part of the productive industry of the country has been established and is maintained. Senators can scarcely fail to see that the pretext of the House committee, if founded on real hardship and actual complaints, would not justify so grave and costly a remedy, while in the absence of such foundation the proposed legislation is utterly destitute of reasonable, even plausible, grounds to rest on.

Some Useful Hints.

Mr. John Sobolewski, in the course of a paper presented by him to the St. Louis (Mo.) Society of Civil Engineers, gave some notion as to how gas should be used and not abused. In his chapter on burners the author presents nothing that is startlingly new, still it is well to remember that which is old and good. The writer says:

Many of us, seeing the large moons of the electric arc shedding their rays about us, think that the days of gas, coal oil, and the "dip" are numbered, and, as far as the dip is concerned, this holds true for lighting purposes at least, as even in the most humble abode the deadly, poison-exhaling coal oil lamp may yet be seen; and we may safely predict that, in spite of its deadly nature, in spite of the numerous accidents and horrible deaths resulting from the use of coal oil and other inflammable fluids, the latter will still maintain its hold for many years to come. When we consider the comparatively absolute safety of gas, its readiness, cleanliness, and ease of manipulation, and approaching it, that of the electric light, the question forces itself upon us, "Why is this thus?" Why persist in using so admittedly dangerous a means of lighting?

As in nature no effect is without a cause, the practical solution of the problem is simply this: It is cheaper than either gas or electric light, when required only in small quantities, on the same principle that walking is cheaper than riding in a horse cars if your travel extends only a few blocks, horse car riding cheaper than walking if you have to go a mile or so, a horse and wagon cheaper than horse cars if your travels are in various directions, and a steam car cheaper than horse car travel if you have to go from New York to San Francisco. Where but a few lights are used, the expense attending the putting in and fitting up for the use of gas, even if the latter were almost given away, would be dearer than lamps, with their attendant risks; and hence we will see coal oil used until it ceases to flow; where comforts are more desired and room increases, gas will be found the cheaper light, while for lighting of vast areas, large squares, or immense halls the arc lights may possibly be cheaper than gas.

In all these cases the question of healthfulness is left out of consideration, the sole factor being now the question of cost.

Theoretically, a wax candle of six to the pound is thirty times dearer than the same amount of light from 16-candle gas at $2.50 per 1,000 cubic feet; yet where there is but one candle required, this candle is cheaper at thirty times the price than 16-candle gas would be, provided all the expense of connecting and fitting up had to be incurred before this gas could be used. The theoretical expression of the relative cost of illuminating agents is as follows:

Say gas is equal to	1	cent per light.
Sperm oil burnt in Argand	8	" "
Mould tallow candle, 6 per pound	12	" "
Sperm oil burnt in open lamp	17	" "
Sperm candles, 6 per pound	24	" "
Composition	29	" "
Wax candles	30	" "

And the relative light given, by assuming the light given by a

Batswing burner, using	5	cu. feet	per hour, as	..	1.00 unit.
A large Argand	" 6	"	"	....	2.88 "
A Boston Argand,	" 5.4	"	"	....	2.16 "
A single jet,	" 2.2	"	"	....	1.19 "
A fishtail (Union jet),	4.5	"	"	....	1.51 "
A wax candle, 4 per pound					0.14 "
A sperm candle, 6 per pound					0.11 "
A tallow candle, per pound					0.10 "

We see, therefore, that by using the ordinary pillar burner, which may be found by thousands to one good Argand burner, that we do not derive much more than one-half the light for the same amount of gas used. A great number of complaints about large gas bills and little light are due to this very fact. The gas fixtures, and more especially the burners, are never looked after, and the gas companies are censured and condemned as monopolies and extortionists, when a little knowledge of the relative powers of burners to the quanity of gas consumed, and the adoption of such burner, would materially increase the light and lessen its cost to the consumer.

The gas pressure is another important point. This will vary with the elevation of the locality where it is used. Ordinary coal gas being but one-half the weight of air (sp. gr. 0.42) will rise to the higher elevations and pass through the burners on the second floor with greater velocity than through those on the first floor, those on the third floor faster than on the second, etc.; showing that a comparison of the number of burners used by a person on the second floor with the burners used by another person on the first floor would be no accurate factor in comparing bills—for the same reason the gas bills of people living in high elevations will vary from the bills of those living near the level of the gas works, although exactly the same number and same kind of burners may be employed by both.

The manner in which the conducting pipes in a house are exposed to or protected from the changes of temperature, which in our city often amounts to 30 degrees in 24 hours, has also much to do with the difference in gas bills, as in many houses the pipes are so exposed, owing to their walls with the mortar all on the outside, that the gas passing through same after leaving the meter and being measured, rapidly condenses the heavier hydrocarbons the most valuable part for light—which drop in the form of tarry water back into the meter and fixtures, often to such an extent as to cut off the flow of the fresh coming gas, impoverishing the power of the light and the pocket of the consumer.

We have often seen daylight through walls of newly built houses, where the artistic touch of the bricklayer, in hollowing out his mortar and scraping a little of it from the trowel on the side of a brick, leaves the horizontal joints open. The openings are afterwards covered by the plaster, which then serves as the only partition and protection from the changes taking place outside.

Another source of loss of light is occasioned by the indiscriminate use of globes.

Mr. King, of Liverpool, found:

Clear glass globes to obstruct	10.57 per cent.
Ground glass	29.48 "
Smooth opal	52.83 "
Ground opal	55.85 "
Same, ornamented with painted figures intervening.	73.90 "

While Mr. Storer, an American authority, gives—

Description of Glass.	Thickness.	Loss.
Thick English plate	1-3 inch,	6.15 per cent.
Crystal plate	1-8 "	8.61 "
English crown	1-8 "	13.08 "
Able English window glass	1-8 "	9.39 "
Double German (Belgian)	1-8 "	13.00 "
Single German	1-16 "	4.27 "
Double German, ground	1-8 "	62.34 "
Single German, ground	1-16 "	65.75 "
Berkshire, enameled	1-16 "	51.23 "
Orange colored	1-16 "	34.48 "
Purple colored	1-8 "	85.11 "
Ruby colored	1-16 "	89.62 "
Green colored	1-16 "	81.97 "
Porcelain transparency	1-16 "	97.68 "

Attention should also be paid to the proper height to which fixtures should be hung, as it is a well known law that light decreases according to the square of the distance from the same. The Rev. Mr. Bowditch, in his treatise on coal gas, gives a very practical illustration of this fact. He says:

"Suppose a person placed in a perfectly dark room, and a hole a foot square to be cut in the door of the dark room at 1 foot from the light, and a screen to be placed close to the hole in the door, a square 12 inches on each side would be illuminated by the light, and the rest of the screen would be dark. If the screen be moved a foot from the door, and therefore 2 feet from the light, the illuminated area, will be a square 2 feet on each side, or four superficial feet. If the screen be placed 1 foot farther from the door, 2 feet distance from the hole and 3 feet distance from the light its illuminated area would be 3 feet on each side, and therefore 9 superficial feet, etc. But how much light falls on a given unit of surface? All the light which passed through the hole fell upon the screen when it was close to the door, at 1 foot distance from the light, and this is the entire quantity of light received by the screen at each of its positions. But the quantity which was concentrated upon 1 foot at 1 foot distance was spread over 4 feet at 2 feet distance, over 9 at 3, over 16 at 4, and therefore the quantity at 4 feet from the light upon each square foot must be 4 by 4, equalling 1-16th of the whole, or, at 4 feet distance, the light on each square foot is 1-16th of the light at 1 foot distance."

Latest Move in the St. Louis (Mo.) Gas Supply.

At a meeting of the St. Louis (Mo.) City Council the following communication was received from the Mayor:

"I have the honor to submit to your honorable body through the council, for such action as you may deem proper, communications from Erastus Wells, president of the Laclede Gas Light Company and Gerard B. Allen in behalf of the St. Louis Gas Light Company, proposing to furnish gas to the people of this city on certain terms and conditions, and setting aside a portion of the income arising from such sale of gas, to be covered into the city treasury for street improvements.

"These propositions are in brief as follows: The Laclede Gas Light Company, a company having no exclusive franchise, proposes to sell its gas to consumers at the net price of $1.75 per 1,000 cubic feet, and to pay into the city treasury the sum of 29½ cents per 1,000 cubic feet on gas delivered until the year 1890. After that year, and until the year 1910, selling its gas to consumers at the same price, it will pay into the city treasury the sum of 34 cents per 1,000 cubic feet of gas delivered.

"That of the St. Louis Gas Light Company, a corporation having an exclusive franchise south of Washington avenue until the year 1890, proposes to sell its gas to consumers at $2.25 per 1,000 cubic feet, and to pay into the city treasury the sum of 25 cents per 1,000 cubic feet until the year 1890, after which time and until the year 1910 it will sell its gas to consumers at $1.75 per 1,000 cubic feet, and will pay into the city treasury 34 cents per 1,000 cubic feet, the proposition for this period being identical with that of the Laclede Gas Light Company.

"Neither of these two companies proposes to make any change in the price paid by the city under existing contracts, for the furnishing of gas to, and the lighting, cleaning and extinguishing of the public lamps up to the year 1890, but after that period both of the companies agree to charge not to exceed the sum of $20 per lamp for that service.

"The question of the propriety of adopting these propositions, which, if done, should be done in the form of ordinance, which must be duly accepted by the respective companies, rests with your honorable body.

"I will note for your information from statements made by officers of these companies that the sales of gas by the Laclede Gas Light Company at the present time are at the rate of about 200,000,000 cubic feet per annum and by the St. Louis Gas Light Company of about 400,000,000 cubic feet per annum.

"As there will undoubtedly be a regular annual increase in the output of both these two companies, it is safe to assume that from the present time and until the year 1890 there will be paid by them into the city treasury an average amount of not less than $200,000 per annum, and which amount will undoubtedly be increased to $350,000 during the period between the years 1890 and 1910.

"It seems also a reasonable division of the reduction in the price of gas made by these aforesaid companies between the gas consumers, who do not constitute more than one-fourth of our population, and the city at large. The former class, although receiving much the largest share of the reduction, will be furnished their gas at considerably less than is charged in any other city, with one exception, while the latter will be placed in possession of a very desirable and much needed revenue to be applied to public work."

The communication from Mr. Erastus Wells set forth that the Laclede Gas Light Company agrees and obligates itself to make a contract with the city of St. Louis on the terms of the ordinance presented to the city council on the 5th inst. by Mr. Scudder. The communication from Gerard B. Allen, of the St. Louis Gas Light Company, sets forth that the company or its successor will furnish gas within the district of the company to private consumers and to the city for its public buildings from the date of the proper acceptance of this proposition until the 1st day of January, 1890, for the price of $2.25 per 1,000 cubic feet, and allow consumers the present established rates of discount. The company proposed to pay the city quarterly the sum of 25 cents per M. From January, 1890, until 1910, the successor of the company

shall, south of Washington avenue, furnish gas at the terms in the Laclede Company's proposition, and will light gas lamps at $20 per annum per lamp. Prior to January, 1910, the city shall not permit any person or corporation to lay pipes in the St. Louis Company's district to conduct gas. The St. Louis Company shall transfer or sell its plant and mains and any other property, including all rights involved in the proposition, to such party as it may select as its successor, the successor to assume all obligations.

When these statements were read, Alderman Devoy moved that the vote by which bill No. 85—the bill granting ordinances, subject to certain conditions to the water gas company—was passed be reconsidered. After discussion on the subject, the motion to reconsider was carried by a vote of 7 to 5. Alderman Temple moved that the Secretary be instructed to recall the water gas ordinance bill from the House; agreed to. And thus stands the St. Louis gas question on date of February 9.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Annual Meeting of the Washington (D. C.) Gas Light Company.—At the annual meeting of the stockholders of the Washington (D. C.) Gas Light Company the following gentlemen were elected to the board of directors: Messrs. George A. McIlhenny, B. H. Bartol, Charles H. Rogers, Wm. R. Riley, and Wm. B. Webb. The new board afterward organized with the election of Mr. George A. McIlhenny as President; Charles B. Bailey, Secretary; and John C. Poor, Treasurer.

Price of Gas Reduced at Royersford, Pa.—The Spring City Gas Company, of Royersford, Pa., has reduced the price of gas from $3.20 per thousand cubic feet to $3. The superintendent, Mr. J. J. Nix, announces that the company will make a determined effort during the coming spring and summer seasons to forward the use of gas for cooking purposes. This is but a small company as yet, its average daily consumption being not much over 10,000 cubic feet; still there is a good future before it, and an excellent way of bringing that future nearer to the present will be by pursuing faithfully the system just inaugurated.

Gas Matters at Houston, Texas.—At a recent meeting of the directors of the Houston (Texas) Gas Light Company, held January 15, Mr. T. W. House was elected President, and Mr. T. F. White was chosen to the triplicate office of Secretary, Treasurer, and Superintendent. Supt. White reports a busy and prosperous season during 1883, made so in great measure by his active and zealous watchfulness. In the year ending Dec. 31, 1883, the Houston company paid dividends to its stockholders amounting in the aggregate to $14,000; the company also reports the possession of a surplus fund now footing up to $27,000. This fund is intended to be expended in the enlargement of the works, the extension of mains, etc. The company has two gasholders—one a double-lift, with a capacity of 200,000 cubic feet, the other being a single lift, with storage room for 40,000 cubic feet. In a recent issue of the Journal we called attention to the great development of the gas industry now taking place in the "Lone Star State," and here again recur to it as little less than marvelous. To those who have been and are now acquainted with the natural resources of this truly surprising section of the Union, the wonder is that greater amounts of Eastern capital have not been invested in manufacturing enterprises in that locality. Texas was "fitted out" by Nature to be something other than a huge grazing pasture, and it needs but a very limited range of prophetic vision to descry the time when the "whirr of the mill" will be heard on all sides.

Death of Mr. Strickland Kneass.—After calling the 19th of January session of the Engineers' Club of Philadelphia to order, the President, Col. Wm. Ludlow, said: "I deeply regret, gentlemen, that almost my first official duty as your President is to appear as a harbinger of ill-tidings, in announcing to you the death of our Past-President, Mr. Strickland Kneass, a man whom you all knew, and, knowing, held in the highest esteem—a typical good citizen and good engineer, faithful in every relation of life, full of industry and conscientiousness, devoted to duty, warm-hearted, clear-headed, capable, and honorable."

The Elkhart (Ind.) Company Falls in Line.—It gives us pleasure to chronicle herewith another and important accession to the ranks of the "tariff reformers." A "tariff for revenue only" appears to be the prevailing idea among the gas fraternity of the country just now, and it seems superfluous to add that the policy finds favor with all classes of gas-consuming politicians. There is one sort of free trade which would be warmly welcomed by that not inconsiderable fragment of the populace, viz., the "chronic growler," and this would be free trade in gas; and even then it might be questioned whether the aforesaid "growler," knowing how little trouble and expense he was put to, when generating his own gassy lamentations, would be entirely satisfied and quieted. We are afraid that we shall have to concede that free trade in gas is not likely to trouble the world for hundreds of years; yet there is a description of "tariff reform" of which we have always been zealous and consistent advocates. Simply stated, it is this: Capitalize your business and plant in honest amounts at the start; pay your employees according to their merit and worth—dealing with them in no niggardly fashion—always remembering, Messrs. Capitalists, that the greater part of the success attending your operations in the gas business is gained by the efficiency, aptitude, and carefulness of your engineers, superintendents, and secretaries; and we thus place them since we think that the responsibility is divided and shared in that rotation. Supposing, then, that this is so (on our part we do not suppose it, but assert it), it is but your plain and bounden duty to share with these officials some honest portion of the profits directly attributable to their labors and faithfulness. When this has been done, and when you are earning and paying 10 per cent. on this fair and honest basis of capitalization, let your consumers have the benefit also of the lowest rate at which the product can be sold. Time and again we have urged such a course, and we have urged its pursuance because of its face-evident advantages to both company and consumer. Competition from any and all sources will be made impossible, and "a tariff for revenue only" have been firmly established.

And now to retrace our steps—having quite unconsciously been led away from the strict "line of march" of our "Item" columns. The new schedule of rates shortly to be adopted by the Elkhart company, as announced by Secretary Geo. T. Murdock, is the following:

"On and after April 1st the price of gas will be $3 per thousand cubic feet, with a discount, if paid by the 12th of each month, of—

50 cents per M. when 2,000 cubic feet or under are used per month.
60 " " " 2,000 to 6,000 c. ft. are used per month.
75 " " " 6,000 to 20,000 " " "
85 " " " over 20,000 " " "

"Gas for engines, cooking and heating purposes furnished at last above-named rate. The repeated reductions made by this company in price of gas is the best evidence of the desire of the directory to furnish gas to its consumers at the lowest possible rate. The present reduction cannot be justified unless consumers will respond by largely increasing the use of gas for lighting, heating, and cooking purposes. The absolute cleanliness, economy, and safety in using gas for cooking should commend itself to every housekeeper. We confidently expect that the citizens of Elkhart will show their appreciation of this and other efforts to furnish gas at lowest possible rates by exerting their influence to extend its use."

News from Richmond, Va.—At a recent meeting of the Richmond (Va.) Council, Mr. Frischkorn offered an ordinance reducing the price of gas from $2 to $1.50 per thousand feet from March 1st, 1884. A debate immediately arose as to the possibility of lowering the price of gas without increasing the rate of taxation; also, whether it was just to tax the gas consumers for lighting streets. A motion to table the ordinance was lost, the same fate attending a motion to suspend the rules and pass the resolution. Mr. Campbell then moved to refer the subject to the Finance Committee; Mr. Higgins, who had spoken in favor of the reduction, seeing that the resolution was to be referred, moved that the reference be made to the Board of P blic Interests. This course was agreed to. Mr. Clarke offered a resolution that the Auditor be requested to furnish a statement showing the cost of the gas works, which was carried.

The Board of Public Interests is to determine if the time has not arrived when it will be found expedient to reduce the price of gas from $2 to $1.50. The chief obstacle to the reduction, it is surmised, is the fact that the city of Richmond is spending more money than its direct tax rate of $1.40 on the $100 is at present producing. This idea that the tax levy is not sufficient to support the city's municipal rate of expenditure should not be made an excuse for plundering the gas consumers, since, if the price of gas is to be maintained at $2, when it can be fairly supplied at $1.50, it is in reality taxing the gas consumer twice. It is reasonable to suppose that the majority of the gas consumers are also assessed in the direct tax levy, and it is evidently unfair and unjust that those who burn gas should be made to pay a part, either large or small, of the extra amount needed to maintain the city's expenses, which should fall upon consumer and non-consumer in equal proportion.

What the Board should determine is whether the newly equipped gas works is manufacturing gas at a figure sufficiently low to enable the product to be sold at $1.50, after, of course, allowing a fair rate of interest as profit on the public money invested in the plant.

Looking for Interest on their Money.—It will be recollected that the Brooklyn Board of Aldermen occasioned considerable scandal in the City of Churches about this time last year, owing to their dilatoriness in executing the yearly contracts between the city and the gas companies for the lighting of the public lamps. These contracts should have been entered into on the first day of January, 1883; but they were not made until the 25th day of

June of that year. In the meanwhile the gas companies lighted the streets as usual, but could not claim pay for the service, as the rates for lighting had not been settled upon. When the matter was finally arranged as to what the annual charge per lamp-post should be, the various companies sent in their bills, on July 1st, we believe, for the amounts due. The Citizens, Peoples, and Metropolitan companies did not feel inclined to lose the interest on moneys which they should have justly been paid at the stated periods, and accordingly charged a fair rate of interest to the city on the sums thus held back. That this item of interest was not inconsiderable may be judged when it is stated that the claim of the Peoples Company amounted to $282; that of the Metropolitan, $259.11; and the Citizens reached $230. These interest charges were presented when the bills for arrears were handed in; the question of payment was referred to the Finance Committee for solution, but the committee failed to pass upon them. Since last July a change was made in the method of selecting Brooklyn's Common Councilmen, the Legislature, during the session of 1883, having passed measures abolishing the old system and substituting in its stead a new scheme. The Council for 1884 consists of a body of non-salaried members, and from the personal characteristics of the gentlemen composing the new board it is surmised that the hunt after "bones" will not be so prominent a feature as hitherto prevailed. It is high time that such change was made, for the doings of the old body were simply disgraceful—indeed, at one period in its history two-thirds of the august assemblage were incarcerated in the city jail for a case of flagrant contempt of court.

On February 8th the Finance Committee of the present board considered the gas companies' interest charges, and decided to refer the matter to Corporation Counsel Taylor for his opinion. We do not see how the city can avoid the payment of these claims; they would seem to be manifestly fair and just, and ought to have been settled six months ago.

Street Lighting in Syracuse, N. Y.—The authorities having charge of street lighting matters in Syracuse, N. Y., are far enough behind the times to adhere to the ancient and ghostly practice of the moon-table system. There are about 1,170 street gas lamps in Syracuse, but no regular methods are employed in the lighting. The Syracuse Gas Light Company is entirely subject to the weekly whims of the Common Council, as this body may order lamps to be lighted one week, and have them shut off the next. This practice obliges the gas company to keep a bench constantly fired up and ready for action, entailing vexatious trouble and no little expense. During last year the Syracuse company netted just $1.58½ per thousand cubic feet for gas used in street lamps, and this figure takes no account of losses from various scurces, owing to leaky and imperfect fixtures in the lanterns, the lanterns, lamps, and posts being maintained by the city. Some time since the Council tried a few arc lights by way of an experiment, and at a meeting recently held a resolution was rushed through the Board ordering the city to enter into a contract for 100 arc lights with the local branch of the Thomson-Houston Electric Lighting Company, such contract to cover the term of five years. It was proposed that these 100 arc lights should be distributed over the central portions of the city, and it was calculated that the said 100 lights would displace one-half of the gas lamps. But, even granting that this proportion of displacement was accomplished, the fact still remains patent that but one-third of the whole surface area would be lighted by electricity. If we do not mistake, the total amount received by the Syracuse Gas Light Company for the street lighting in 1883 was $12,000. If the five years contract ordered by the Board had been executed, at the prices proposed, Syracuse would have had the pleasure of paying the neat sum of $16,300 extra per annum, or $81,500 for the five years, for its street lighting service. In his veto of the resolution Mayor Ryan, among other things, said: "I am disposed to favor a contract for proper electric lighting, and for a sufficiently long period to induce prcper competition, but doubt whether, in the present state of the art of electricity, it would be advisable to contract for so long a period as proposed in this resolution." The veto of the Mayor was sustained. Then Alderman Keefe, who, it is said, is a stockholder in the Thomson-Houston Electric Lighting Company, moved that the city advertise for bids, for five days, for lighting the streets by the Thomson-Houston system, both for one year and three years, according to specifications furnished by the city surveyor and engineer. A brother Alderman suggested that this was a queer looking sort of competition that was invited, and Ald. Keefe, in reply, stated that there were from 25 to 30 companies in the United States operating under the Thomson-Houston system; but Ald. K. failed to show how many of the 30 were operating in Syracuse. The opposition to the immediate passage of the resolution was so strong that the whole question was laid over for one week. Thus the matter stands up to our latest advices, and we expect to recur to the subject again.

An Opposition Gas Scheme "Blocked" at Springfield, Ills.—At the regular monthly meeting of the Springfield (Ills.) City Council, held Monday, February 4, the proceedings attracted more than ordinary interest, owing to the fact that consideration was to be held on a petition from certain parties asking that a new corporation, styling itself the Citizens Gas Company, be allowed the use of the streets to put down gas mains, operate a gas works, etc. The usual claptrap about monopoly, etc., was appended; in brief, the "usual striking" formalities were all strictly adhered to. When part of the ordinary routine business of the board had been disposed of, Alderman Black moved that the rules be suspended for the purpose of considering the gas ordinances. The Clerk then read the proposed ordinance creating the Citizens Gas Company; Alderman Hall presented a prelimina y bond of $10,000, in case the measure should become a law, and also offered an amendment to the ordinance, as read, directing that a higher price than $1.50 per thousand should never at any time be charged by the company. The bond bore the names of S. H. Jones, P. P. Mast, and L. M. Potter. Alderman Fleury, at this point in the proceedings, suggested that the ordinance governing the actions of the existing Springfield Gas Company be read. This was agreed to, and amendments proposed thereto, which, in short, were that the company should at no time charge more than $1.50 per 1,000 feet, nor a greater sum than $15 per annum for street lamps; that the light should be at least of 16-candle power, and that the company be not compelled to make main extensions where the gas consumption would not reach a certain consumption each 24 hours. These amendments were all agreed to on behalf of the Springfield company, coupled with the proviso that the Springfield company should be granted the exclusive privilege of operating a gas works within the limits of the city. When all these things had been submitted, the representatives of the two companies were invited to speak, and give their arguments pro and con. Mr. Kerrick, on behalf of the new company, said that his side could present no more powerful argument than the largely signed petition which had been handed in. He stated that the new company would not have agreed to sell gas at the low figure proposed, unless it had reasonable grounds to suppose the rights asked for would be granted. He noted that a large number of the city's streets were lighted with gasoline, while some were not even lighted at all. He doubted the ability of the old company to properly perform the new tasks sought to be imposed, and referred to the solvency of the bond put forward by his side of the question, and wound up by asking the members of the Council to act in a spirit of fair play. Governor Palmer, on behalf of the Springfield Gas Company, spoke to the other side of the question. He said that those proposing the opposition scheme were, doubtless, missionaries, and were there without being influenced by selfish motives. He then said: "When Springfield was a village, a bond in the sum of $10,000 had been given by the company. Nearly twenty miles of pipe had been laid, and they have furnished what was supposed to be gas of good quality." Governor Palmer then asked that the old company's ordinance be further amended so that it be required to furnish a light of 16-candle power, and then asserted that his client would agree to begin delivering such a light that very day. In speaking to Mr. Kerrick's doubts as to whether the Springfield Company could fulfil the new conditions, Governor Palmer said: "It would be as easy for the old company to do this as for the proposed company to go ahead and lay its mains. Suppose now, the companies furnish equally good gas and at equally low prices; the people of Springfield want a cheap and good illuminant, and care not who furnishes it. Why, then, should the proposed grant be made? These gentlemen have spent little or nothing in the town. They have been heard, and promise to do something at some future time; the streets should not be torn up. Pass this ordinance and damage may be done to the property of your citizens without compensating advantages to anybody. It is but reasonable and fair that the investments already made should be respected, especially when competition can do no better. The true mode of prosperity is to treat with consideration the investments already made."

A vote was then taken on the question of passing the ordinance granting corporate life to the Citizens Company; it was rejected—five voting in favor, and nine against. Mr. Fleury then moved that the ordinance to govern the future of the Springfield Company be put upon its passage. Alderman Hall attempted to have the words "exclusive use of streets and alleys," and that "no other company be allowed to come in," stricken out, but the proposition was negatived. Mr. Hall then wanted to know from the city attorney whether the Council had power to make an exclusive grant, and Mr. Salzenstein, the gentleman interrogated, replied that the right to grant exclusive possession to one gas company had never been passed upon directly by the Supreme Court of Illinois. A vote, being finally reached, resulted in the triumph of the old Springfield Company, who will now, as we understand the case, have entire control of the gas supply of the city. Springfield's Council acted wisely in the matter, and we think they will have no occasion for regret in the premises.

Lighting Brooklyn's Streets for 1884.—At a recent meeting of the Lamps and Gas Committee of the Brooklyn (N. Y.) Common Council, the bids of various gas companies for lighting the streets of the city for 1884 were opened and read. The bids were as follows: Peoples Company, $23.20;

Williamsburgh, $22.80; Nassau, $22; Brooklyn, $19.80; Citizens, $23.20; Fulton Municipal, $20; Metropolitan, $23.20. In comparing the prices bid with those which were accepted last year, but little difference is perceivable. In fact the notable difference is that shown in the case of the Nassau Company. The Nassau Company, last year, lighted the street lamps in its district at the rate of $23.20; this time it notes its willingness to make a reduction of $1.20 per post. The Fulton Municipal did not perform any portion of the street lighting in 1883, but now offers to light for $20 a post, or 20 cents more than the Brooklyn Company's present bid of $19.80. To judge from the "bleatings" of the water gas pipers one would certainly expect to see them figuring in the role of the lowest bidders—but they are not in that category.

When the subject of taking action on the above recorded bids was discussed, Chairman Kane thought it hardly seemed proper to take immediate action, for the reason that the appropriation was not large enough to cover all the contracts at the figures given. Last year the appropriation was $325,000; this year it is but $314,000, and 300 or more posts had to be maintained over the number maintained in 1883. Alderman Kane then suggested that only two courses were open to the committee—either to re-advertise for proposals that would come within the amount of the budget allowed for the purpose, or else invite a conference with the responsible officials of the gas companies, to see if they might not reduce the prices asked to such a notch as would render re-advertising unnecessary. This puts us in mind of the action taken by the Gas Trust officials of Philadelphia last spring, when, after soliciting bids for gas coal supplies for the year, they ordered a new set of bids made. This is hardly right to *bona fide* bidders, whose prices are, by such sort of rules, made common property. No final result was reached, but we hope a conclusion will be arrived at sooner than that of last year. The total number of public lamps in Brooklyn foots up to 14,611.

At the same meeting of the committee, Mr. John A. Nichols appeared on behalf of certain applicants who desired to introduce the electric light in Brooklyn; he asked the Chairman whether it was intended to consider these applications immediately. The reply was made that such matters would not be adjusted until the present more pressing business of gas lighting was disposed of.

The Lincoln (Ills.) Gas Light and Coke Company Reduces Price of Gas.—The gas works at Lincoln (Ills.) is owned by Mr. S. A. Foley, and this gentleman is thoroughly imbued with the idea that more is to be made by following out the principle of selling a large quantity of gas at low rate of profit than by disposing of a small quantity at big profit. On February 1, Mr. Foley issued the following circular to his consumers:

"Prior to February 1, 1884, all gas bills have been rendered at the uniform rate of $2.50 per 1,000 cubic feet. From February 1, 1884, to all who consume 1,000 feet and over, through one meter, in any month, the bill therefor will be rendered at the rate of $2 per 1,000; under 1,000 feet per month the bills will be rendered at the rate of $2.50 per 1,000. The form of bills will not be changed, and this reduction will only be assured to those who pay by the 15th of the month.

"Four years ago a liberal reduction was made to all consumers, in the hope that an increased consumption would justify it. This hope has been realized, and a still further reduction is now submitted. Your cordial co-operation, with prompt payment of bills, will, I trust, justify me in making the present reduction. For the future I shall do what I can to supply the best light for the least money, only reserving to myself a fair return upon the capital invested." There is little reason to doubt that Mr. Foley's course will find sufficient justification from the hands and pockets of Lincoln's gas consumers.

More Trouble Caused by the Floods.—The terrible scenes of a year ago are being enacted over again, and accounts of suffering and loss occasioned by the turbulent waters come in from various sections of the South and West. Cincinnati, Ohio, had its gas supply shut off on the 11th—at least, so the despatches state. The Ohio river is even higher than the altitude recorded at the worst period of the freshets in 1883, and the end does not seem to be yet reached. The months of December, 1883, and January, 1884, will be long remembered for their severe climatic conditions of rigorous frosts and inordinate snowfalls. Had the thaws which followed been of reasonable length, unaccompanied by heavy rains, the natural drainage channels would not have been overtaxed; but the sudden rise of temperature experienced melted the surface snows, the frozen ground (in a great many sections the frost had penetrated to the depth of two feet) was unable to absorb any of the moisture; hence the deplorable results now being witnessed. The foolish policy of stripping the uplands of all forest growths must in great measure be chargeable with the increased force and vigor of the abnormal annual spring rises in our great Western rivers, but the greedy lumberman-capitalist will pay no heed to the voice of nature's warning, pursuing his wasteful course unchecked by reason, and, to the shame of our legislators be it said, unhampered by the law.

Carrying out the Promises.—The Evansville (Ind.) Gas and Electric Light Company, in presenting its bill for gas consumed by the city, during the month of January, made a reduction of 50 cents per thousand in the prices formerly charged. The old price was $2 per thousand cubic feet—the new rate is but $1.50. This reduction was entirely voluntary on the part of the company, and the step was not made necessary through public clamor. When the opposition, led by Messrs. Fitch, *et. al.*, was refused admittance in Evansville the Evansville Gas Company promised to deal fairly with the city and the public, and this step plainly shows that the promises were made honestly. Mr. F. J. Reitz, in his communication to the Common Council announcing the reduction, says, "In our former notices to the public, and also to your honorable body, we intimated that our company would, as soon as practicable, reduce the price of gas; and the reduction referred to is the initiation of a policy prophetic of the future."

A Narrow Escape—A young Danish woman, named Hansen, had a narrow escape from suffocation through the accidental inhalation of illuminating gas in her room at the Scoville House, Waterbury, Conn., on the night of January 28. A physician named Griggs, residing in the hotel, after spending three hours over the sufferer, succeeded in restoring her to consciousness.

New Meters for the Philadelphia (Pa.) Gas Trust.—On Friday, February 1, the committee on distribution of the Philadelphia Gas Trust opened bids for supplying gas meters for 1884. The bidders were Messrs. Dickey, Tansley & Co., Baltimore, Md.; D. McDonald & Co., Albany, N. Y.; Helme & McIlhenny, Goodwin Gas Stove and Meter Company, American Meter Company, and Harris, Griffin & Co., of Philadelphia, Pa. Samples from the different houses will be required before the awards are finally made. The sizes of meters called for ranged from 2 to 500 lights. The meter bids, as also two others for supplying gas burners, were referred to a special committee for scheduling.

The Field of Death.—It is not in the nature of things as they exist to suppose that the personage, seated by a glowing anthracite coal fire, and enjoying comfort from its radiated heat, gives great attention to the danger and hardship encountered by those whose labors make this comfort possible. From the reports of the several mine inspectors in the anthracite region of Pennsylvania we learn that during 1883 no less than 1,676 persons were killed or injured in the several mining accidents recorded for the year. The number killed outright is placed at 323, or one death to every 96,000 tons of coal mined. These black figures show an increase, over 1882, of 31 deaths.

Water Gas in New York City not to be Investigated.—We noted, in a previous issue of the Journal, that Assemblyman Charles Smith, representing one of the New York city districts in the lower legislative branch, had introduced a resolution directing the Committee on Public Health to investigate the process by which water gas for illuminating purposes is being manufactured in New York and Brooklyn, the per cent. of profit paid by the consumers, and whether the use of such gas is dangerous to public health. When the resolution was first presented Mr. Husted objected to immediate consideration, and so the matter went over under the rules. When the subject was reached in its regular order on the calendar, some days afterwards, a very lively time ensued. Assemblyman Husted, whose reputation as a legislator is not of the most savory description, was very active in his opposition to the passage of the resolutions, and, among the rest of the arguments advanced in support of his position, stated, "he regarded it as the opening measure to ruin the moral character of the Legislature." To make a long story short, the way in which the defeat of the measure was secured was this: Mr. Earl, of Kings County, moved that the Committee on Public Health be granted the services of a stenographer to assist in the investigation; this was adopted, and the fact of its adoption involved an expenditure of the public money, making it necessary that 65 affirmative votes should be secured to pass the main resolution directing the investigation. When the vote was taken but 59 votes were given in the affirmative—39 voting against. Speaker Sheard declared the motion lost.

A Familiar "Bill."—The annual "bill" seeking to regulate the price of gas at $1.50 per 1,000 cubic feet in the cities of New York and Brooklyn, with provisions for purity, candle power, inspectors, penalties, etc., made its annual appearance in the Legislature at Albany on a late date. An Assemblyman named Burns is the sponsor of the measure, and hails from Brooklyn; what troubles him most, we opine, is a "burning desire" to make a "strike." This is not the way to get cheaper gas for these two great cities; if the men of the Burns stripe would only cease their suspicious looking efforts, and let those qualified to handle the question take it up, the days of high-priced illuminating gas would speedily be numbered.

Gasoline Explosion.—A very destructive gasoline explosion occurred in the hardware establishment of F. M. Orr, at Alliance, Ohio, on Friday,

February 1. Several persons were killed, and a large number seriously injured. Buildings and property in the vicinity were damaged to the extent of $75,000. The whole trouble was brought about by a child who turned on a faucet attached to a barrel of the "liquid murder." The vapor found its way speedily to a heating stove, and now "Alliance mourns its loss."

The Market for Gas Securities.

The city gas share market presented, for the period under review, no marked features of interest, and the general situation may be summed up in saying that strength still remains the prominent characteristic. Fluctuations are confined to narrow limits, except in the case of Metropolitan gas. In regard to this particular stock we are afraid our opening remarks hardly bear the impress of strict truthfulness; still, viewing the progress of values noted in the quoted prices, as given by us for the past three months, an advance of 5 or 10 points in Metropolitan has ceased to in any respect savor of the phenomenal. This stock was rated by us, in our February 2d issue, at 225 with 10 per cent. dividend "on;" our present figures (Feb. 14) show that it is bid for at 225, ex-dividend, a clear gain of 10 points in less than a fortnight. It would be useless to place an asking price on it, since no lot of stock, either large or small, has been offered at any figure. Manhattan gas we quote at 272, offered nominally, at 275; this asking price is also purely guess work—as it is open to considerable doubt whether a transfer could be effected at the figure. We note that a small lot of Manhattan was advertised to be sold at auction on February 13, but was withdrawn. New York gas is strong and higher, 154 bid, offered at 156. Municipal gas active and decidedly higher, at 212 to 214. Mutual also is in the ascending scale at 134 to 136—we note a sale at auction of 10 shares of Mutual (Feb. 13) at 135; also 5 shares Municipal, same date, at 212½, and 160 shares Harlem, at 121½. This latter stock we quote at 119 to 121. The Central people are out with another circular; it will be remembered that the management of this company some time ago made a scrip dividend of 50 per cent. The latest circular announces that the last dividend is at the rate of 4 per cent. per annum, the reduction being made necessary on account of the proposed erection of a new holder to cost $75,000. The management may have had satisfactory reasons for the scrip dividend of some months ago, but the whole process is very mystifying to those on the outside. Equitable gas is at 91 to 96.

Brooklyn shares are fairly steady; 200 shares Brooklyn gas, at auction, at 132; Citizens, 90 to 91; Fulton Municipal, 112 to 114—$5,000 Fulton Municipal 6 per cent. bonds, at auction, at 109; Peoples gas, 70; Metropolitan, 85 to 88; Nassau, 75; Williamsburgh, 112 to 115. In out-of-town shares, Baltimore (Md.) gas, 52¼ to 53¼. Citizens, Newark, 101 to 105; Jersey City, 158 to 162; Washington (D. C.) 175 bid. Richmond county (S. I.) company has increased its rate of dividend from 6 to 7 per cent. Poughkeepsie (N. Y.) gas is worth par. Anyone having a small lot of this stock to dispose of could probably find a purchaser by addressing this office.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

Engineering Curiosities.

NEW YORK, February 7th, 1884.

To the Editor AMERICAN GAS LIGHT JOURNAL:

In order that "A. B. T.'s" question may not be left in obscurity and suffer from the cold neglect of an inappreciative world, I will try to elucidate his rather abstruse problems. As to his first question, what would be the effect of raising the temperature of his scrubber to 125°? my answer is that he would make a tar-pit of his purifiers. It seems to me it would have been better if he had first tried the experiment and then reported progress, because, if it turned out a success, scrubbers would then be useless appendages to a gas works.

In regard to the second question. Once in my lifetime I saw just such an arrangement as he suggests—it may be in operation at the Citizens' works in Rochester, N. Y., still; but when the exhauster got too full of tar they opened a bye-pass, and, as an attendant told me, "let her rip." To my mind, putting a scrubber before the exhauster would compare with "setting the cart to draw the horse."

Speaking of Rochester and exhausters reminds me of another curiosity at the old works there. This was in the hydraulic main, which was of a good size and D-shaped. Mr. Parsons, the then superintendent, complained to me of the incessant stoppage of the standpipes. As the works had been recently remodeled, and he was not a practical man, with my usual zeal for the good of others I undertook to locate the trouble, which I found was caused by running the dip-pipes to within 3½ inches of the bottom of the main, consequently there was only 4½ inches of tar in the center of the main; not covering the circular bottom, and being close to the top of the retort stack, the tar was converted into solid pitch; the friction on the exhauster, in its efforts to drag the gas from the retorts, was so great that it was heated to such a degree as to appear as if it had a fire inside. Each dip-pipe was 5 inches too long, consequently 12 inches square of the hydraulic main was of no use. Whether it remains so at this time I am unable to state. As the president of the company informed me, he clearly saw the defect; but he explained the expense would be too great, since the remedy involved the construction of a new main.

One feature to be found at these works, and one which they claimed to be proud of, is an outside stopcock to every service, thus enabling them to shut off a delinquent consumer without entering his premises. I wonder how such an arrangement would answer in New York city; it would seem to be a good thing for the burglars. These gentry could learn to shut off the gas from the house, and rob it at their "own sweet will." Fancy a fashionable ball, and some uninvited one turns off the gas. Oh, my! etc.

While we are dealing with curiosities, here is one from St. Catharines, Canada. At this place I found a carpenter by profession, who some years before had succeeded to the charge of the gas works, taking the place of a practical gas man. The former superintendent, in the praiseworthy attempt to improve the efficiency of the plant, had just installed a new scrubber and had it ready to work. Instead of being allowed to go ahead and reap the benefit of his improvements, his "check" was made out. The scrubber remained in idleness, although years had elapsed—this was in 1874.

Taking now a glance at the Toronto (Can.) works. The exhausters have a good deal of uphill work, the pressure gauges showing 18 inches. Proceeding on to Kingston, Canada, I found clay retorts a novelty in the "Limestone City." Here I "struck oil," and placed 21 clay retorts in the house before I left, although a stock of iron retorts had just arrived from England, and, I suppose, remain there still.

By the way, I had supposed iron retorts belonged to an epoch encompassed by the "misty past." Imagine my surprise when, a few months ago, I read in the JOURNAL that the Philadelphia (Pa.) Gas Trust had accepted a contract for iron retorts; for I believe it is generally admitted that while a clay retort can be bought at one-half the cost of an iron one, it will also do ten times the work. So, if the parties who are seeking to purchase the Philadelphia city works have not this fact in view, I think they will do well to bear it in mind. But still the Trust may have good and sufficient reasons why they prefer iron to clay, of which we know not. Yours truly,

JOHN KEELING, C.E.

Water Gas Vetoed.

PHILADELPHIA, PA., February 7th, 1884.

To the Editor AMERICAN GAS LIGHT JOURNAL:—

The Binghampton (N. Y.) Gas Light Company changed its works, a short time ago, from the "old-fashioned" coal gas process to that of the Lowe water gas. Though made at considerable expense, I doubt whether they find the alteration "all that fancy painted it." The following clipping from a Binghampton paper, of January 29th, speaks for itself:

"BINGHAMPTON, Jan. 23, 1884.

"*To the Honorable the Common Council of the City of Binghampton:*

"I return without my approval the resolution passed by the Common Council Jan. 16th, authorizing and directing the Mayor and Clerk to enter into a contract with the Binghampton Gas Light Company to light the street gas lamps, upon terms set forth in proposal of the company, and the report of Committee on Water and Gas. The poor quality of the gas now furnished in the city is the cause of much and just complaint. Any contract that is made ought to require a guarantee that the gas should have a certain illuminating power. Respectfully, J. S. WELLS, Mayor."

And yet, the war cry of the oil and water gas crusaders is "High candle power!"

ANTIQUUS.

An Answer to "A. B. T."

NEW YORK, February 8, 1884.

To the Editor AMERICAN GAS LIGHT JOURNAL:

In answers to the inquiries of "A. B. T.," in your last issue, I would say that steam will not eliminate the ammonia and sulphuretted hydrogen from the gas so readily as a stream of cold water will. There is nothing in the scrubber that will take up these impurities, but the water, and the stronger the water is in ammonia the more readily will it purify the gas from sulphuretted hydrogen and carbonic acid, and the colder the temperature of the water the better will it take up the ammonia.

If we could only get the water to hold enough of ammonia, and bring it thoroughly in contact with the gas, we would require neither lime nor iron for subsequent purification.

As to his second question: I would say it is a good thing to separate the gas from the tar as quickly as possible, and before it reaches the exhauster. But I doubt if a coke or brush scrubber would work satisfactorily between the hydraulic and exhauster, owing to its liability to become clogged with tar.

It is preferable to have a scrubber composed of layers of perforated sheet iron at that point, since such an arrangement presents no obstruction to the flow of the tar.

J. S.